Passthrough of Treasury Supply to Bank Deposits

Wenhao Li[1] Yiming Ma[2] Yang Zhao[3]

[1]USC Marshall Business School

[2]Columbia Business School

[3]Stanford Graduate School of Business

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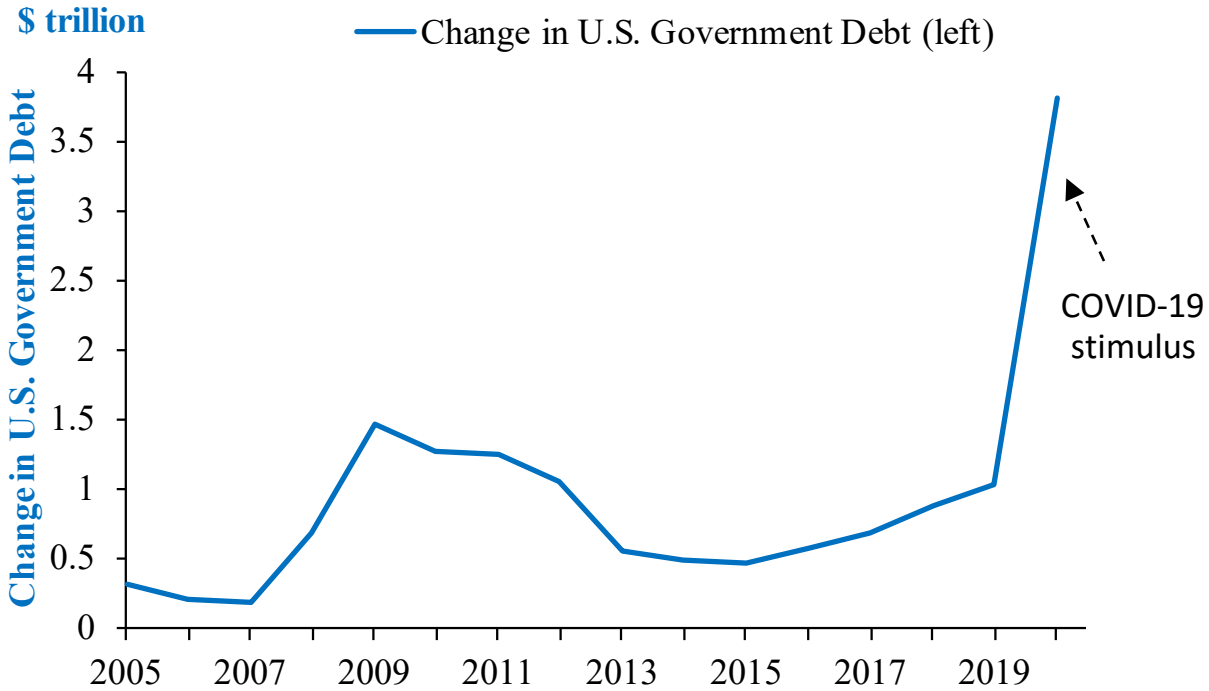
Introduction



How does Treasury supply affect bank funding?

- Key: Treasuries and deposits are substitutes in providing liquidity services to investors.

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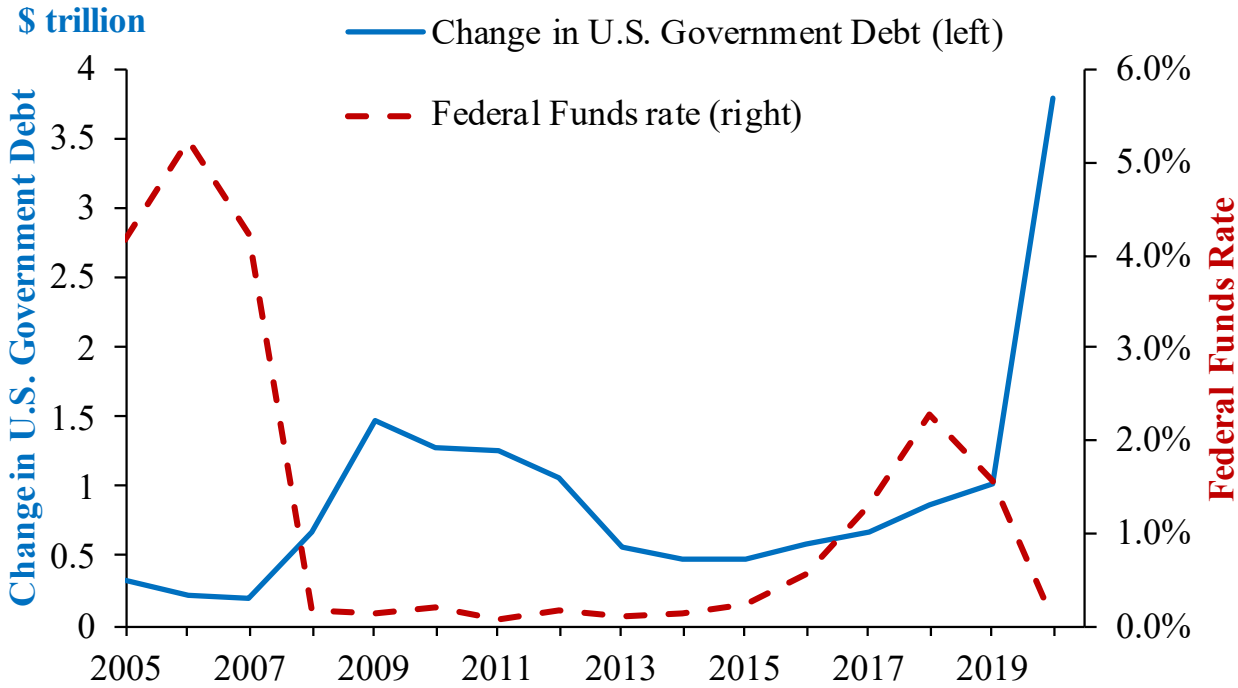


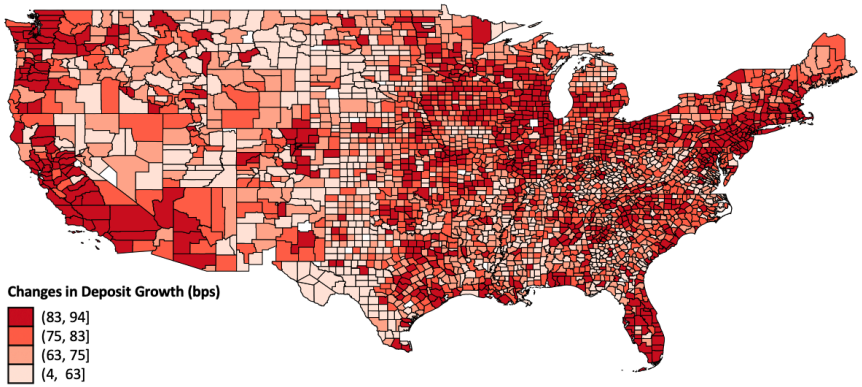
How does Treasury supply affect bank funding?

- Key: Treasuries and deposits are substitutes in providing liquidity services to investors.
- How does this impact relate to monetary policy?

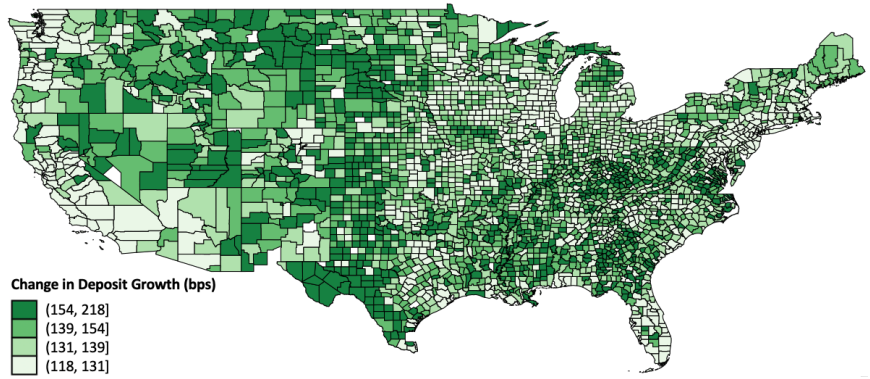
Preview of Results

1. Treasury supply shrinks bank deposits while federal funds rate (FFR) cuts expand bank deposits. But opposite distributional effects.

Treasury Supply



Fed Funds Rate



2. Treasury supply and FFR cuts decrease wholesale funding reliance.

3. Policy implication: Reverse Repo Facility (RRP) follows Treasury supply effects.

Literature Review

- Treasury supply and banking
  - Safe asset literature e.g. Krishnamurthy and Vissing-Jorgensen (2012, 2015), Greenwood, Hanson and Stein (2015)
- Monetary policy and bank deposits.
  - Our results complement Drechsler, Savov and Schnabl, 2017 ("DSS 2017" hereafter)
- Impact of revers repo facilities.
  - Krishnamurthy and Duffie (2017)
- Fragility of wholesales funding.
  - Prignon, Thesmar, and Vuillemey (2018)

A Model of Deposit Competition: Investors

- Two period, with banks and investors.
- Investors invest in:
  1. Bank deposits (rate r_i^D for bank i)
  2. Treasuries (rate r^G)
  3. Risk-free bonds (benchmark rate r, the monetary policy rate)
- Maximize return with additional preference for liquid assets (CES over deposits and Treasuries), which are imperfect substitutes.

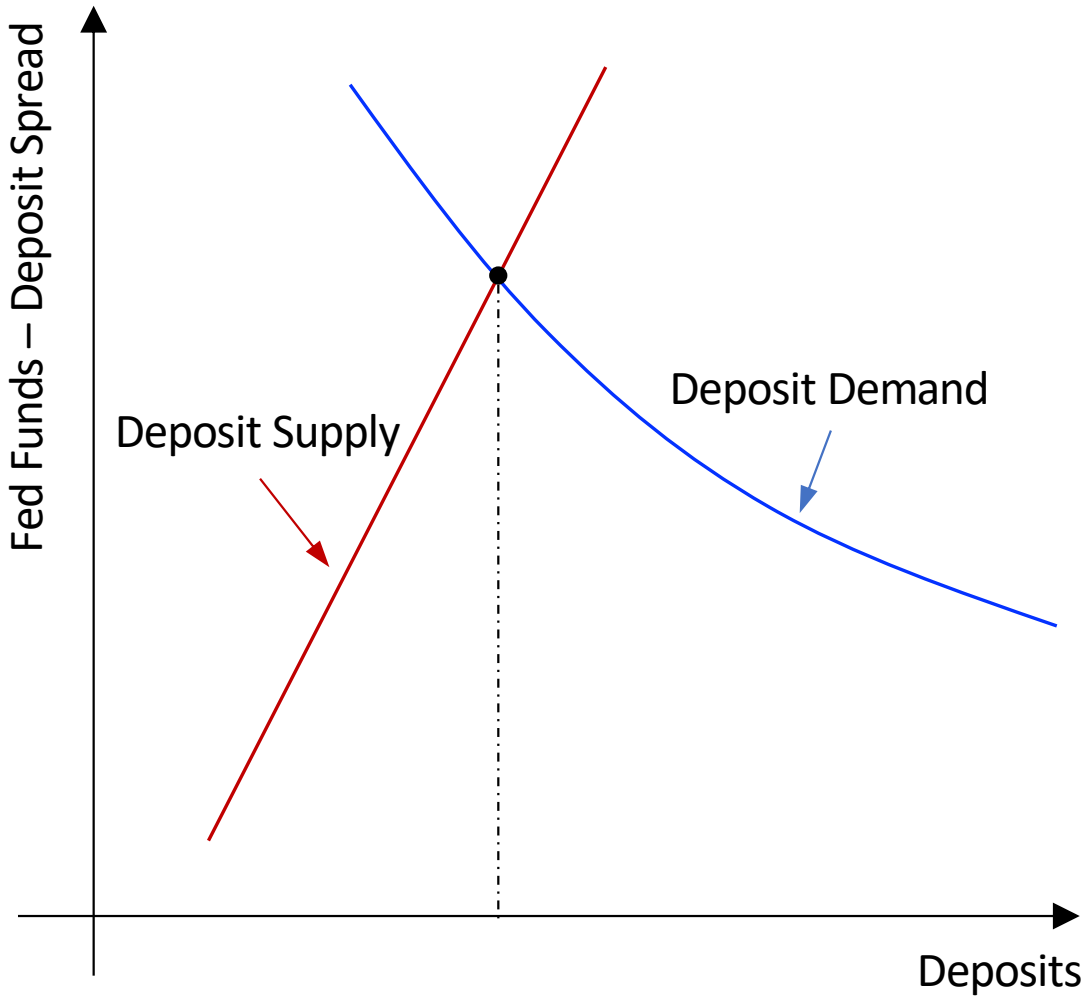
A Model of Deposit Competition: Banks

- N banks raise deposits and invest in loans and Treasuries (limited liquidity demand for Treasuries)
- Set deposit rates r_i^D considering local deposit demand curve
- Set loan rates r_i^l facing a downward sloping loan demand curve
- Assume symmetric banks ($r^D = r_i^D$, $r^l = r_i^l$). **Aggregate** deposit supply is more elastic when
  - More banks compete in deposit markets
  - Deposits at different banks are better substitutes

A Model of Deposit Competition: Market Clearing

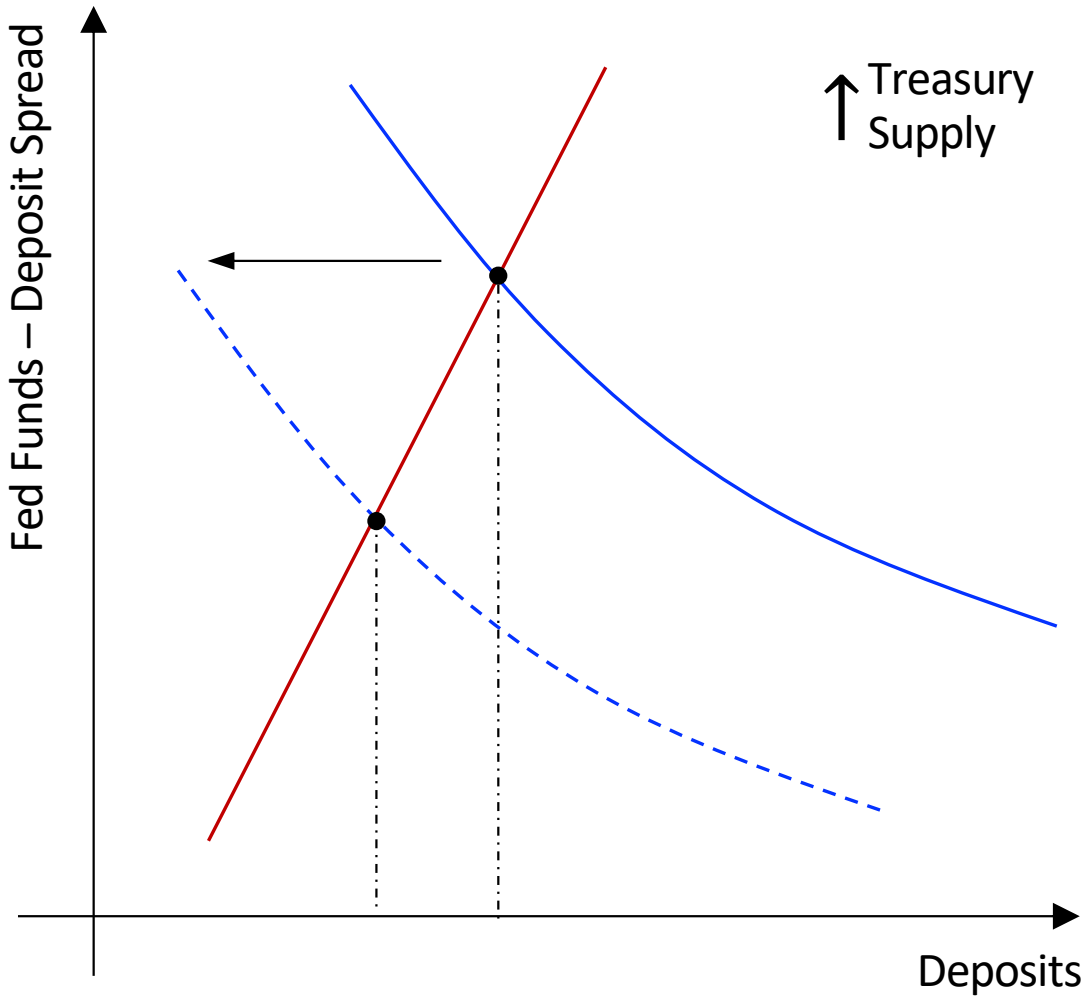
- Deposit demand from investors = Deposit supply from banks
- Treasury demand = Treasury supply outstanding

Deposit Supply and Demand Curves



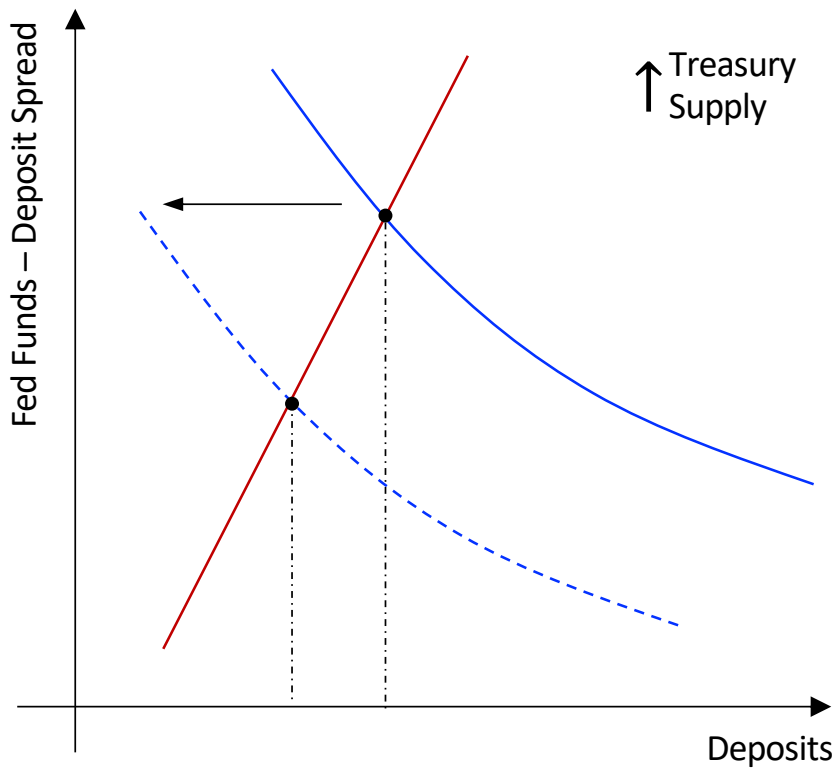
Treasury Crowding-Out Effect

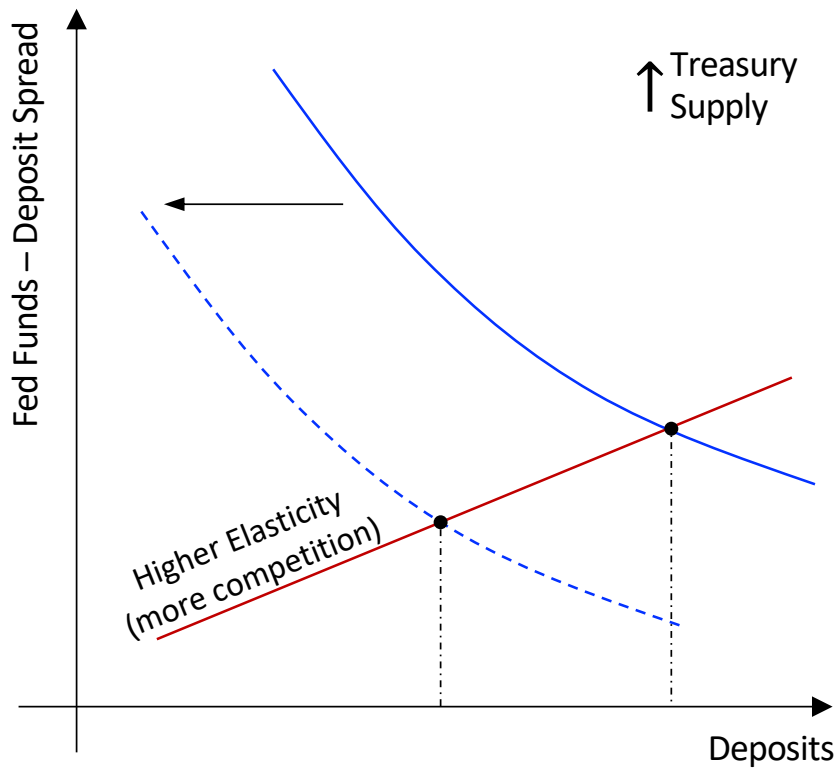
- When **Treasury supply** ↑, Deposit volume ↓.
- Key: Commercial banks mainly invest in loans, not Treasuries



Treasury Effect and Deposit Competition

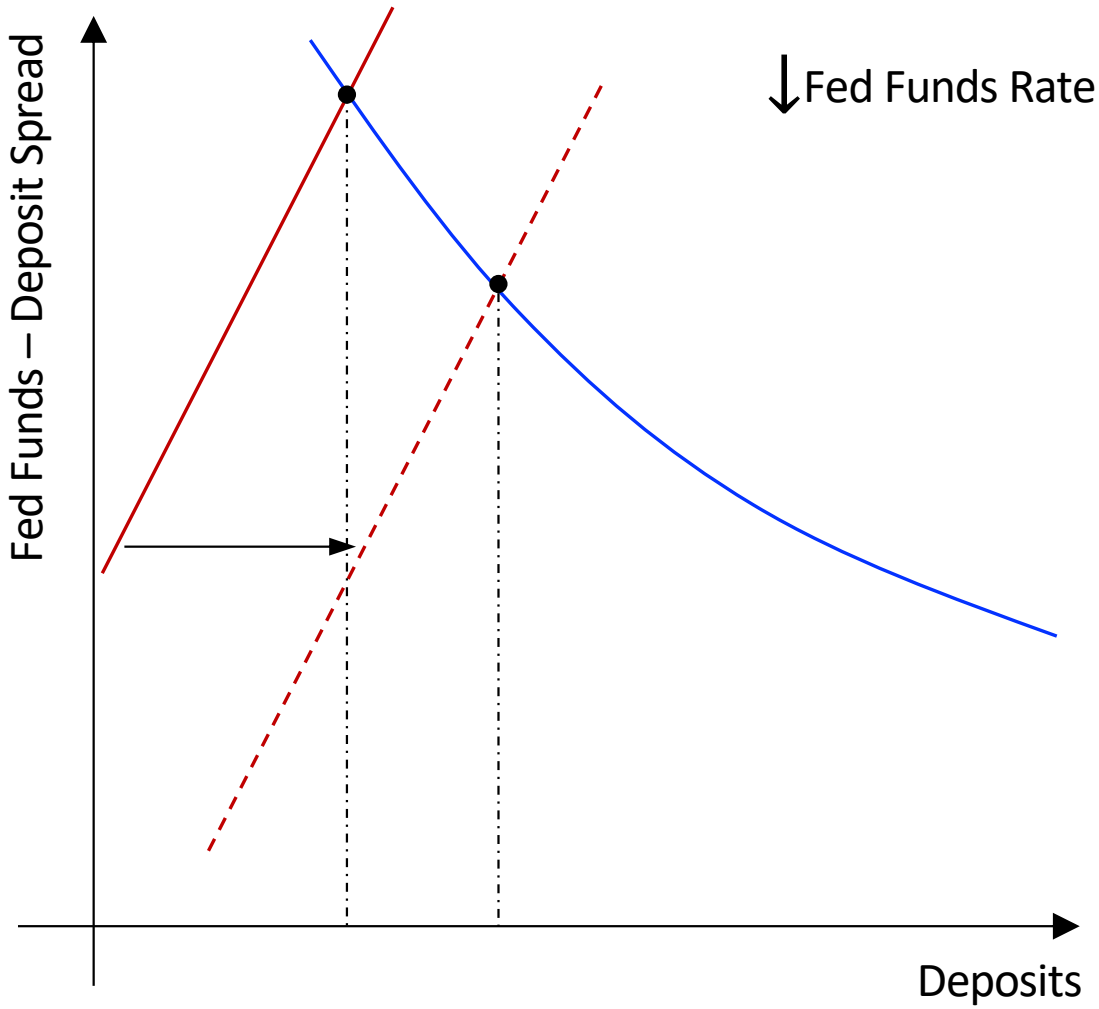
- Deposit volume change is **more pronounced** when deposit **competition is higher** (i.e. more elastic deposit supply)





FFR Effect

- When **FFR** $\downarrow \Rightarrow$ bank loan profit margin $\uparrow \Rightarrow$ banks expand balance sheets $\Rightarrow$ deposit supply $\uparrow$



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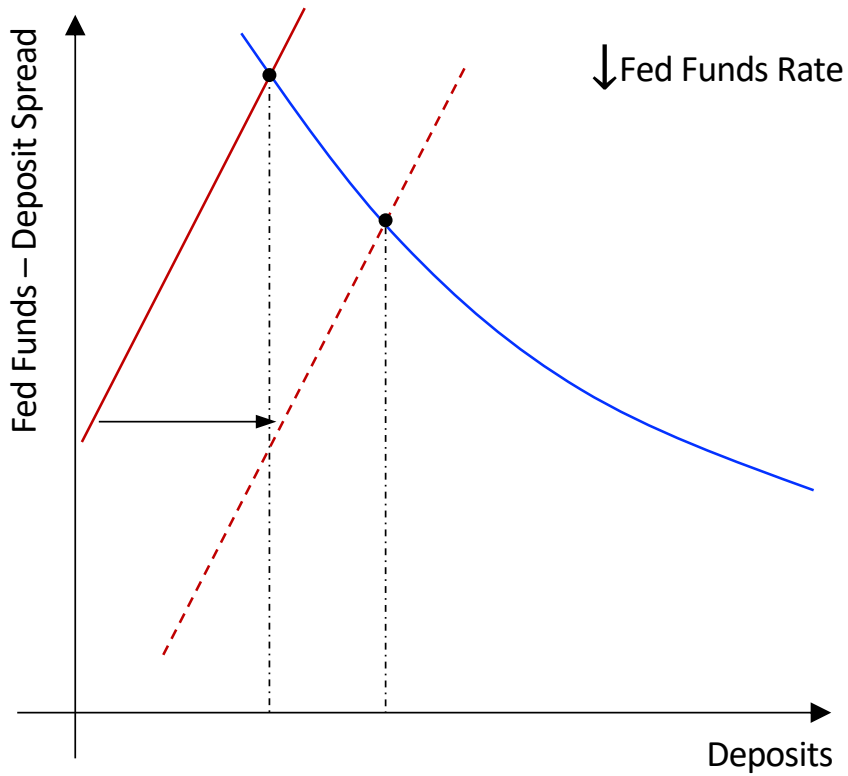
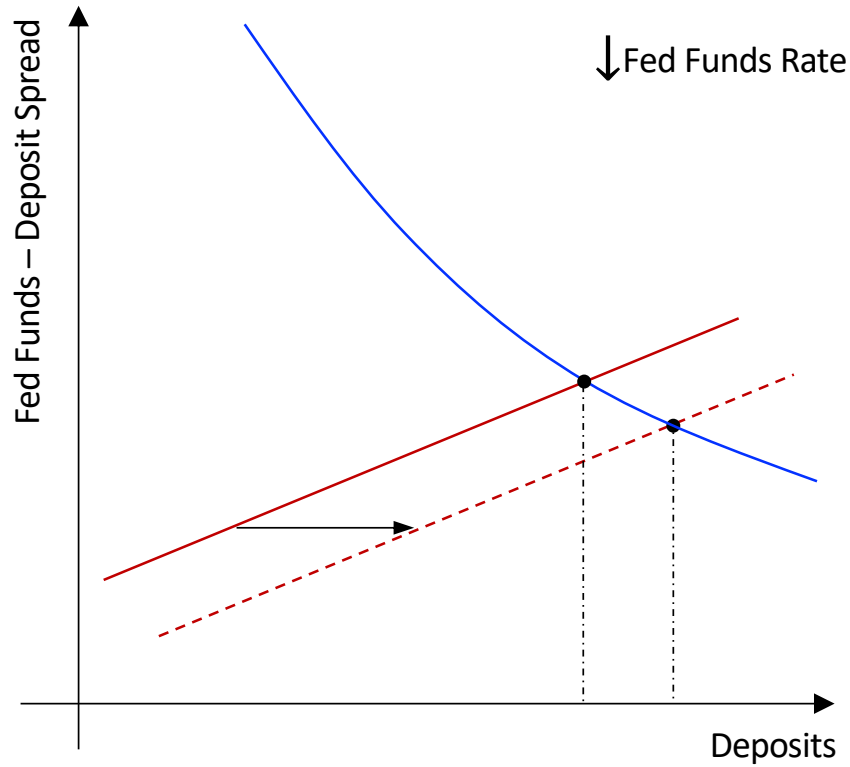




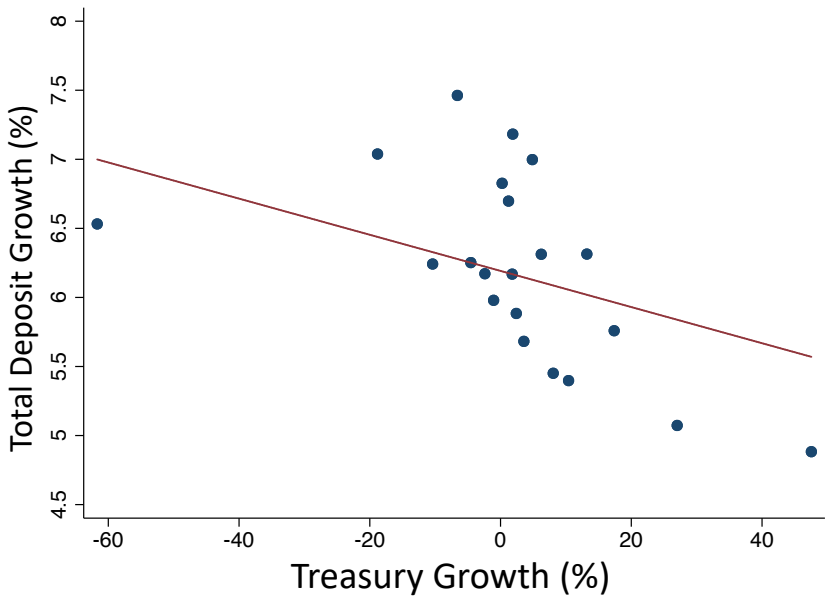
Wholesales Funding

- **When Treasury supply ↑,** wholesales funding ratio decreases.
- Intuitions: wholesales investors are more actively substituting between Treasuries and wholesales deposits.
- **When FFR ↓,** wholesales funding ratio decreases.

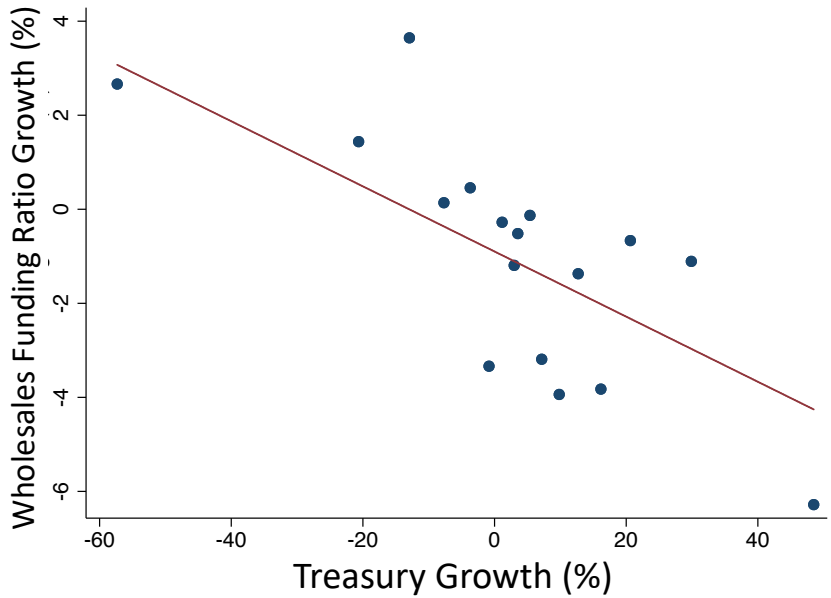
Empirical Challenges

We would like to test the model predictions...

Deposit growth



Wholesale Funding Ratio Growth

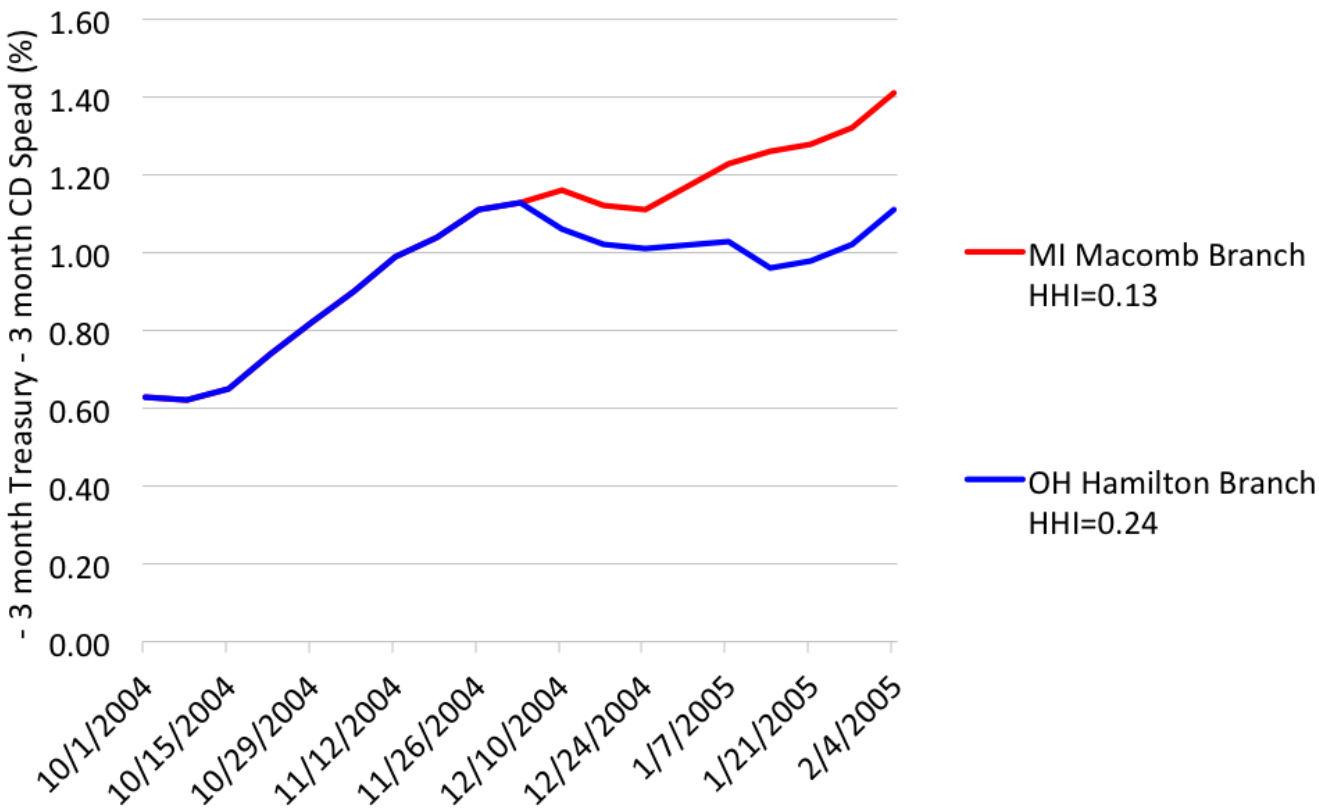


...but everything is co-moving in the time series, e.g. investment, Treasury supply, and deposits.

Empirical Strategy

We use the cross-section to compare the responses to Treasury supply across branches of the same bank. (HHI = Herfindahl index)

- Example: Huntington Bank
- Treasury growth from 04Q4 to 05Q1 increased by 3.24%



Data

- Branch-level deposit rates by deposit type: Ratewatch (1997-2016)
- Branch-level deposit volumes: FDIC (1994-2016)
  - County-level HHI (sum of squared deposit market shares) as proxy for deposit competition
- Bank-level data: U.S. Call Reports
- County characteristics: County Business Patterns

Results: Passthrough to Bank Funding Capacity

$$DepGrowth_{it} = \alpha_i + \eta_c + \lambda_{st} + \delta_{jt} + \beta\, TSYGrowth_t * HHI_c + \gamma \Delta FFR * HHI_c + \epsilon_{it}$$

	Branch Level Deposit Growth Rates	
	(1)	(2)
TSY Growth * HHI	0.086**	0.084**
	(0.039)	(0.039)
Δ Target FF * HHI		-0.007***
		(0.003)
Observations	1,503,852	1,503,852
R-squared	0.338	0.338
Bank Year FE	Yes	Yes

All specifications also include state-year, branch, county and year FE.

- ↑ in Tsy growth → larger deposit outflows, when HHI is lower (more competition)
- ↓ in Δ FFR → smaller deposit inflows, when HHI is lower (more competition)
  Consistent with DSS 2018

Results: Passthrough to Bank Funding Capacity

- For a branch at the 25% quantile of HHI (more competitive) relative to one at the 75% quantile (less competitive):
  - 1 s.d. $\uparrow$ in Treasury growth $\rightarrow$ 20.2 bps larger drop in deposit growth
  - 1 s.d. $\downarrow$ in Δ FFR $\rightarrow$ 22.4 bps smaller increase in deposit growth

- We use cross-elasticities to calculate the aggregate deposit response towards Treasury growth following DSS.
  - Growth rates.
  - Quantities: the recent increase of Treasury supply by \$ 3 trillion (due to COVID-19 stimulus) will crowd out deposits by about \$120 billion.

Results: Bank Funding Structure and Financial Stability

		Δ Wholesale Funding Ratio
TSY Growth	-0.030***	-0.036***
	(0.001)	(0.002)
TSY Growth * Bank HHI		0.029***
		(0.009)
Δ Target FFR	0.002***	0.002***
	(0.000)	(0.000)
Δ Target FFR * Bank HHI		-0.001**
		(0.001)
Observations	1,007,682	966,954
R-squared	0.011	0.010

Bank FE and bank controls are included. SE are clustered at the bank level. Data are at quarterly frequency from 1986 to 2016.

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- **1 s.d. $\uparrow$ in Treasury growth $\rightarrow$ wholesale funding ratio $\downarrow$ by 32.8 bps**
- **1 s.d. $\downarrow$ in the FFR $\rightarrow$ wholesale funding ratio $\downarrow$ by 26.6 bps**

Policy Implications: Reverse Repo (RRP) Facility

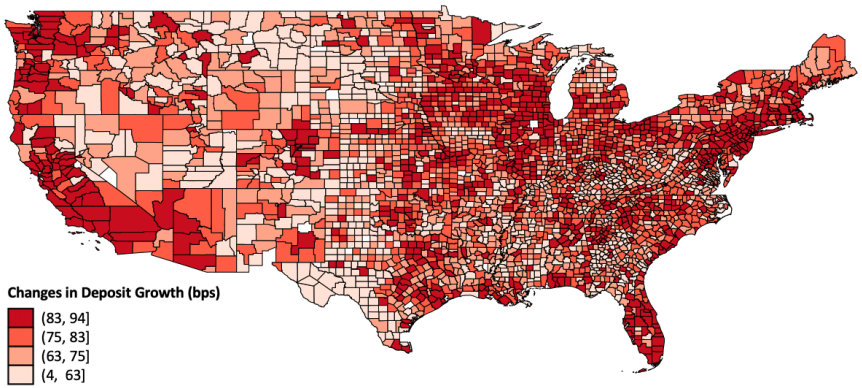
- Since Sep 2013: MMMF allowed to directly deposit with the Fed to earn the RRP rate.
- Challenging to measure the impact of RRP facility directly.
- **Model predicts that RRP rate hikes resemble the effect of Treasury yield increases**:
  - Investors hold Treasuries through MMMFs
  - MMMFs are affected by RRP rate changes as they are by Treasury yield changes
- Finding: RRP rate hikes add on **a quarter** of the effect of Fed Funds Rate hikes on deposit outflows.

Additional Results and Robustness

1. Heterogeneity in the substitution between Treasuries and deposits.
   - Haircut-weighted average of Treasury supply.
   - Liquidity premium weighted average of Treasury supply.
2. Investor sophistication
   - Control for income, age and college degree etc.
3. Slow-moving Treasury supply
   - 5-year growth rate, non-overlapping samples.
4. Loan competition:
   - Subsample of above median income counties
   - Subsample above median sized banks

Conclusion

Treasury Supply



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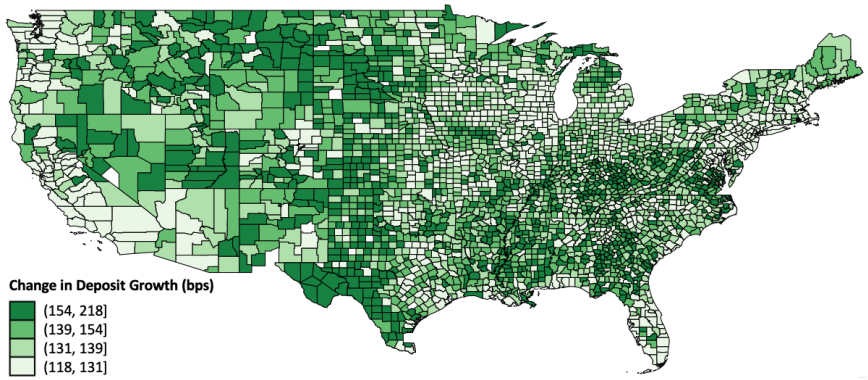

- With more deposit competition, Treasury crowding-out effect on deposits is stronger, while FFR impact is weaker.
- Both Treasury supply and FFR cuts decrease wholesale funding ratio and improve financial stability.
- Policy: reverse repo facility acts differently from typical monetary operations!